

OCT -5 1922

REQUEST FOR RETURN OF COPYRIGHT DEPOSITS

Dated at WASHINGTON D C

October 5th, 19 22

Register of Copyrights,
Library of Congress,
Washington, D. C.

40054 OCT-522

Dear Sir:

The undersigned claimant of copyright in the work herein named,
deposited in the Copyright Office and duly registered for copyright pro-
tection, requests the return to him under the provisions of sections 59 and
60 of the Act of March 4, 1909, of one or both of the deposited copies of the
Ford Educational Film (3 reels) entitled "The Fordson Analyzed"
(Two copies)

deposited in the Copyright Office on and registered
under Class, XXc., No. ©Clm 2198

If this request can be granted you are asked and authorized to send
the said copy or copies to me at the following address:

..... or
to Ford Motor Company, 451 Penna Ave., N.W., Washington, D.C.

at

Signed FORD MOTOR COMPANY
(Claimant of Copyright)

July, 1920-500

Received the above:

Chief Clerk,
Washington Branch.

W.D. Lynham
FORD MOTOR COMPANY
Chief Clerk,
Washington Branch.

6 Copies Returned

OCT 6 1922

Delivered in person

OCT -5 1922 ✓

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✓ "THE FORDSON ANALYZED" ✓

✓ Produced and Distributed by Ford Motion Picture
Laboratories ✓

Copyrighted 1922 by Ford Motor Company. ✓

1. NOTE: In the following read first the titles then watch for animation illustrating the idea expressed. This with undivided attention will insure full benefit from the film.
2. What kind of power drives the Fordson tractor? A four-cylinder combustion motor using kerosene and gasoline.
3. How does the Fordson motor operate? On the four-cycle principle which means that each cylinder requires two revolutions of the crankshaft or four strokes of the piston; two up and two down, to complete the cycle.
4. How does the Fordson motor develop its power? Gasoline or kerosene vapor when mixed with air and compressed is highly explosive. Each cylinder acts separately as follows.
5. The working parts consist of: valves, inlet and exhaust, piston, connecting rod, camshaft, crankshaft.
6. The camshaft making one revolution to two of the crankshaft operates the intake and exhaust valves.
7. On the downward stroke of the piston draws a mixture of gasoline or kerosene vapor and air through inlet valve into the cylinders.
8. To insure a full charge the inlet valve does not close until camshaft has passed the bottom center.
9. The upward movement of the piston compresses the mixture.
10. As the piston reaches the top the mixture is fired by electric spark.
11. Expansion of the burned gases forces the piston downward thus producing the power that turns the crankshaft.
12. At this point the exhaust valve opens and the remainder of the downward and upward strokes exhaust spent gases through outlet valve and exhaust pipe.
13. As the piston arrives at the top of the stroke the exhaust valve closes and the inlet valve opens.
14. These actions are repeated in regular order in all four cylinders, giving a power stroke to each half turn of the crankshaft.
15. How is the charge fired? By a high tension electric spark supplied and timed by --
16. The Ignition system: magneto - Primary wire - spark coil units - commutator - timing gears - spark plugs.
17. Where is the current generated? In the magneto consisting of 16 permanent magnets attached to the fly wheel, and 16 coils of wire and a stationary support attached to the cylinder block.

18. There are lines of magnetic force passing between the poles or ends of magnets.
19. Cutting these lines of force with a wire excites an electric current in the wire as may be noted on the millivoltmeter.
20. As the fly wheel revolves the lines of force are cut by the coils, thereby generating a low voltage current.
21. As it requires a current of several thousand volts to jump the gap in the spark plug it is necessary to transform this low voltage current to high voltage.
22. This is done in the spark coil.-- magneto terminal - magneto - soft iron core - primary winding - condenser - secondary winding - commutator - spark plug terminal - spark plug.
23. A current passed through the primary coil induces magnetism in the soft iron core.
24. These lines of force pass out through the secondary winding, which contains an enormous number of turns of fine wire.
25. This magnetism also acts ~~on~~ on the vibrating armature, drawing it down and thereby breaking the circuit.
26. The momentum of the current thus cut off is absorbed by the condenser and is immediately discharged back through the primary, causing the core to demagnetize rapidly.
27. These rapidly moving lines of force being cut by the secondary wire induces a current of from fifteen to twenty thousand volts.
28. It is this current that jumps the gap on the spark plug causing the flame that ignites the charge.
29. What determines when the cylinder should fire? The commutator brush is so located on the camshaft that it makes a contact with the spark coil of each cylinder at the time the charge is compressed.
- - - - -
30. What prepares the fuel and air for the cylinders? A special vaporizing system consisting of - gas tube - fuel tube - float chamber - vapor tube - mixing chamber - intake manifold - exhaust manifold - air washer - main air supply tube - primary air tube.
31. To give a rich mixture while cranking the air is choked off by priming valve.
32. Fuel from the gasoline tank is used for starting only.
33. It is drawn directly into the mixing chamber where it is mixed with air and passes through the inlet manifold to the cylinders.
34. The exhaust gases heat the vapor tube in a short time making it possible to switch to the vapor system by first turning the shifter valve to cover "G".
35. The mixing chamber.
36. Second, move the shunt valve lever to "On".

37. Third, shut off the gasoline petcock.

PART II

38. The fuel now flows from the main tank to the float chamber.
39. Float chamber.
40. The fuel level is controlled by a float which rises closing the float valve.
- 41.. The fuel passes through a hole in the needle valve, and is drawn from the spray nozzle, being carried into the vapor tube by air from the primary air tube.
42. Here it is completely vaporized by the heat of exhaust gases.
43. It then enters the mixing chamber.
44. The mixing chamber, where it is mixed with a metered volume of air to form a combustible mixture, which is drawn through the intake manifold into the cylinders.
45. The quantity of mixture is regulated by the throttle valve.
46. The volume of air is automatically controlled by the air valve, which lifts, giving correct proportion of air for any load or speed.
47. What is the purpose of the exhaust shunt valve? When the valve lever is at the position "On" the exhaust passes around the vapor tube giving the maximum heating effect.
48. When on the position "Off" the exhaust passes through center of shunt valve. This gives a low temperature to the vapor and can only be used in starting and when the tractor is doing heavy pulling in hot weather.
49. What adjustment is necessary to the vaporizer. After the motor is warmed up, turn needle valve to right until motor misfires.
50. Then turn to left until highest speed is obtained with no smoke coming from exhaust pipe. This usually takes one-half turn.
51. Note the position of adjusting rod on the dash for future adjustment.
52. THE AIR WASHER.
53. What is the purpose of the air washer? To cleanse and moisten the air and keep grit out of the working parts.
54. What are its parts - air inlet - bowl - float - air deflector - float guide - cover - main air supply tube - primary air tube.
55. The air washer. The action of the piston sucks the air up into the float guide.
56. The float keeps the open end of the air guide at the proper distance under water at various levels.
57. The air is drawn down between the float guide and air intake into the water.

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58. The dirt is caught by the water and settles to the bottom.
59. The air deflector removes the surplus water from the air.
60. If the water becomes too low the air supply is cut off, causing the motor to misfire and stop.
61. While the tractor is in operation the water and mud must be flushed out daily.
- - - - -
62. THE VAPORIZING SYSTEM.
63. What prevents the water from becoming too hot?
64. Thermo-syphon cooling system consisting of - upper tank - upper connection - radiator core - fan - lower tank - lower connection - water jackets around cylinders.
65. What cools the water? Air drawn through the radiator fins by fan.
66. How does the water circulate? The water heated around the cylinders becomes lighter and rises.
67. Water cooled by the radiator becomes heavier and settles, thereby replacing the rising hot water.
68. Thus eleven gallons of water is kept circulating while the motor is running.
- - - - -
69. How is the power transmitted from the motor to the rear wheels?
70. Through the clutch - transmission - worm and gear - differential - rear axle.
71. What is the purpose of the clutch? To disconnect motor from remainder of power line.
72. The clutch is made up of two sets of discs - the larger discs are notched on the outside and fit on the keys of the clutch drum.
73. The smaller discs are notched on the inside and fit on the fly wheel studs.
74. These discs are assembled alternately, and are pressed tightly together by springs, thus connecting the motor to the transmission.
75. When pressure is applied to the clutch pedal the springs are compressed permitting the discs to revolve freely

PART III

76. This action disconnects the motor from the rear end.
77. What is the purpose of the transmission. To give different speed ratios between the motor and rear axle in order to regulate the pulling power to meet the demand.
78. The principle of increasing the pull through speed reduction is seen daily in the lever.
79. Two equal weights at equal distances from the fulcrum on a beam will balance.
80. If one weight is moved twice as far from the fulcrum it will balance twice the weight but will have to move twice as far as the heavier weight.

81. The heavier the lift the longer the lever and the greater distance it travels.
82. Thus in low speed the motor turns about 80 times and in high speed and in high speed 18 times to one revolution of rear wheels.
83. This is how the tractor reduction would look if made through one set of spur gears, the small gear one foot in diameter.
84. This reduction is made in the small space occupied by the transmission and differential.
85. All changes of ratio are made in the transmission.
86. A pair of gears is moveable on each shaft.
87. The front sliding gear on the upper shaft and rear sliding gear on the lower are keyed with splines so that they turn with the shaft.
88. The rear gear of the upper shaft and front gear of the lower turn freely on shaft.
89. The gears are in mesh at all times. Different speeds being selected by sliding one gear into another, thus engaging them by external or internal teeth.
90. ~~#####~~ In neutral now power is transmitted through the gears.
91. In low speed the gears on the upper shaft are moved back, bringing the gears indicated into action.
92. Intermediate speed the gears on the upper shaft are moved forward giving the transmission line indicated.
93. For high speed the gears on the lower shaft are moved backwards the power being transmitted as indicated.
94. For Reverse the gears on the lower shaft are moved forward the power being transmitted through idler gear as indicated.
95. Reverse motion is obtained by introducing an odd number of gears into the train, all forward speeds having an even number.
96. How are the gears moved? By means of the gear shifter.
97. What prevents the lower and upper gears from becoming engaged at the same time? A locking pin holds one of the shifter shafts.
98. A spring pin on the other end of shifter shaft holds the gears in desired position.
99. What is the purpose of the differential? To compensate for the difference of speed of rotation of rear wheels when making turn.
100. The differential consists of the housing - differential gears which fit onto axle shaft - spider and pinions.
101. ^{the ends of the axle shafts} The pinions turn freely on the shafts of the spider. , and are meshed with gears on

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102. The spider is held securely in the housing which is bolted to the worm gear.
103. Therefore when the worm gear is rotated the differential housing, spider and pinion gears must turn with it.
104. Since the pinions ~~are~~ are meshed with the gears on the ends of the axle shafts the shafts must also turn.
105. If the resistance to traction becomes greater on one side than on the other the wheel with the greater resistance will slow down or stop while the other wheel continues to turn.
106. This is accomplished by the pinions on spider revolving on their shafts, causing the free wheel to revolve more rapidly.

THE END.

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